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MAR 27 1939

SAFETY

with Light

. . . THE NEW
TECHNIQUE IN
STREET LIGHTING
PRACTICE

3-27-39

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
Edgewater Park • Lighting Division • Cleveland, Ohio

Lighting on this Detroit Street before modernization consisted of 10,000 lumen lamps in upright luminaires, 18 feet high, 110 feet apart. The street appeared black to the motorist. Obstruction is scarcely visible.



NIGHT DRIVING IS HAZARDOUS

The increase in traffic accidents and fatalities in the past ten years has aroused every civic-minded citizen. Safety crusades have been organized which have resulted in more stringent enforcement of traffic laws and drivers' licenses. Educational information for drivers and pedestrians alike has appeared in increasing abundance. And while these measures have proved effective in reducing daytime accidents, which in the

six-year period ending December 1935 decreased 12 per cent, **night traffic fatalities have continued to rise** and in the same period increased 37 per cent.

This means that conditions beyond the control of the driver must be reckoned with—namely, **visibility conditions!** Safety efforts, to be successful, **MUST** include measures which will improve night visibility such as adequate street lighting systems.

After modernization in Detroit, with the same lamps, the same spacing, but with 22-foot mounting height and new pendant luminaires mounted over the roadway, adequate surface brightness is provided for drivers.



LIGHT PROBLEM VARIABLE . . .

As a factor in traffic safety, light differs from all others in that it possesses the inevitable element of change. As a problem it is not limited to a study of conditions existing at one type of intersection, or one particular corner; to the number of traffic lanes, or the location of signs or signals. It is an all-embracing factor, the significance of which can be appreciated only through a general study and broad view of traffic accident statistics and a comparison of night and day traffic experience.

NIGHT DEATHS INCREASE . . .

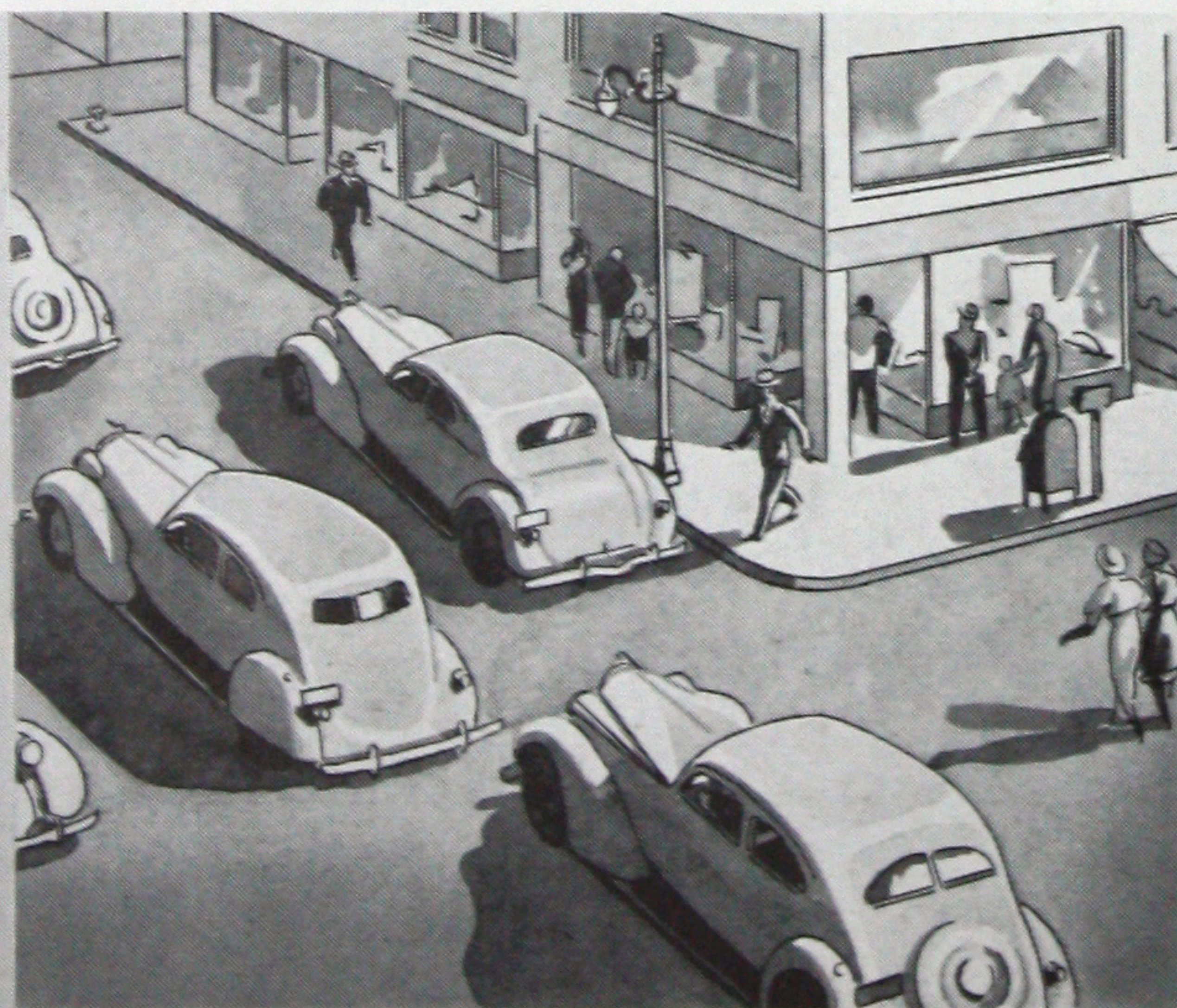
Twenty years ago, nighttime casualties were only 30 per cent of the total motor fatalities. Today they have risen to more than 60 per cent. Statistics for 1936 show that the traffic volume during the

hours of darkness was 20 per cent of the total volume, from which it is obvious that during the hours of darkness 20 per cent of the traffic produced nearly 60 per cent of the fatalities, while during the daylight hours 80 per cent of the traffic produced only 40 per cent of the fatalities. And the majority of the auto accident victims were pedestrians.

"WHITE-WAY AREAS" . . .

It is established that street illumination throughout the world is below the requirement for safety except in business districts or in so-called "white-way areas." In the business districts of many cities super lighting is provided for its advertising value. Yet, the many miles of streets not included in these areas and the important thoroughfares are too often inadequately lighted. It is here, and at

80% OF TRAFFIC IN DAYTIME 20% OF TRAFFIC AT NIGHT



Statistics from national surveys show that the traffic volume during the daytime is 80% of the 24-hour volume.



Only 20% of the 24-hour traffic is at night. Yet, the accident rate reaches a peak during the hours of darkness.

dangerous intersections, and also between crossings, where ineffective illumination reaches the pavement from obsolete lighting equipment, that the majority of accidents occur. Many cities, proud of their downtown illumination, have added to the toll of fatalities caused by poor visibility in outlying districts.

A LESSON IN DETROIT . . .

During the depression, Detroit, like many American cities, attempted to save money by curtailing its street lighting service. The results proved anything but an economy measure, as evidenced by the increase in night traffic fatalities.

A comparison of the day and night fatal traffic accidents, taken from the Detroit police records for the first ten months of 1931, 1932 and 1933, clearly shows the direct connection between street illumination and traffic fatalities.

1931
Lighting Without Curtailment
(No Safety Campaign)

Night Deaths	Day Deaths
124 or 51%	119 or 49%

1932
Lighting Curtailed 35%
(Intense Safety Campaign)

Night Deaths	Day Deaths
151 or 67%	75 or 33%

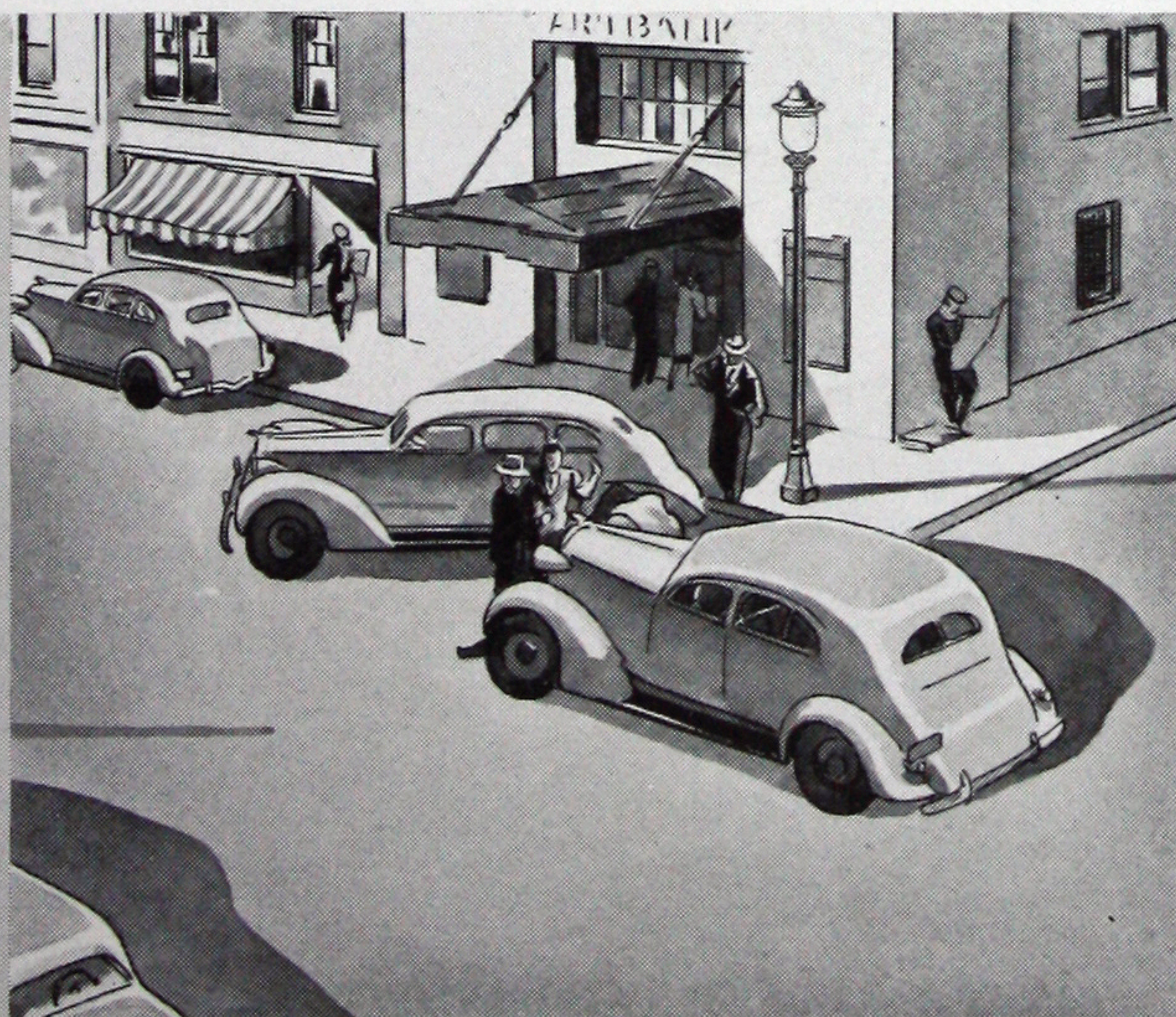
1933
Lighting Curtailed Only 15%
(No Safety Campaign)

Night Deaths	Day Deaths
139 or 60%	90 or 40%

Thus, Detroit's experience showed that the high night traffic death rate was due primarily to the reduction in lighting service. The safety campaign had no effect, as the figures show, on the night fatality rate although it did aid in reducing daytime traffic fatalities.

In a recent survey of 47 American cities with a total population of 19,000,000,

40% OF DEATHS IN DAYTIME 60% OF DEATHS AT NIGHT



Day traffic fatalities have been reduced from 70% of the motor deaths twenty years ago, to 40% today.



Surveys show that of the total number of motor accident deaths occurring in a 24-hour period, 60% are at night.



Downtown thoroughfare in Springfield, Mass., before street lighting was modernized. This photograph shows the inadequate illumination typical of lighting in hundreds of cities.

Mr. R. E. Simpson, nationally known traffic expert, found that main traffic thoroughfares were the most dangerous streets and that pedestrian night fatalities account for 77 per cent of the total deaths. These thoroughfares represent only 10 per cent of total street mileage, but account for 46 per cent night and 30 per cent day fatalities. Over 70 per cent of total fatalities were pedestrians, and of these 69 per cent occurred at night.

Thus, need for increased visibility for the driver by adequate urban street lighting is obvious. Even more obvious is the need for immediate action on main thoroughfares and particularly between intersections of these thoroughfares.

LACK OF VISIBILITY . . .

Streets, automobiles, drivers, traffic regulations, signals, et cetera, are the same after nightfall as during the day. The one change that night brings is the low visi-



Night drivers now are provided safe driving conditions on this Springfield street. The modern lighting system provides intense, uniform and glareless illumination on the street surface.

Before modernization, lighting on this Detroit street consisted of 10,000 lumen lamps in upright luminaires, 18 feet high, 110 feet apart. The street appeared black to the motorist. Obstructions are scarcely visible.



bility which increases all usual daytime hazards, reduces the time allowance for lifesaving reflexes, subjects the eye to conditions with which it cannot cope and increases many-fold the deadly potentialities of traffic hazards. And, worst of all, the average driver apparently is not wholly aware of the causes which catapult him into night driving tragedies.

SAFETY CAMPAIGNS FAIL . . .

The safety campaigns sponsored by munic-

ipalities, newspapers, magazines, radio, schools and insurance companies have accomplished excellent results in reducing the daytime accidents but they have failed to lower by the merest fraction the night accident rate. These agencies have released great amounts of educational material emphasizing the responsibility of the driver. Much of this publicity has been tied in with the efforts of legislatures and regulatory authorities in curtailing



With the same lamps, same spacing, but with 22-foot mounting height, and new pendant luminaires mounted over the roadway, adequate surface brightness is now provided the automobile driver on this Detroit street.

the traffic fatalities. The driver has been given new regulations to observe, new driving practices to learn, and, at the same time, has had the advantage of safety-designed streets and highways and safer automobiles. The driver has been warned to drive at a reasonable speed, to make sure of the mechanical fitness of the car and his own physical fitness. Yet . . . night fatalities increase.

AUTOMOBILES IMPROVED . . .

Every available safety factor has been built into the new automobile to reduce accidents and fatalities. Steel tops, improved brakes, safety glass, steel bodies, better headlights, lower center of gravity and a host of other automobile design and equipment changes have been added primarily in the interest of driving safety.

USE OF HEADLIGHTS LIMITED . . .

Automobile headlights have a definite place in night driving, but their usefulness is limited. If every car carried headlights to provide adequate illumination, the result, with present types of headlighting, would be a blinding glare to both approaching drivers and pedestrians. The light source for modern illumination must be out of the driver's range of vision to remove all possibility of glare conditions.

BETTER DESIGNED STREETS . . .

Safety engineers are constantly endeavoring to reduce causes of traffic injuries and deaths by co-operating with street and highway builders. New types of paving have been devised to lessen danger in wet and icy weather. Streets have been widened and danger at intersections and grade crossings reduced.

OLD TYPE CAR AND MODERN AUTO



In modern low-built cars, eyes of the driver are nearer the street surface than in older, higher cars, and are thus below the level at which the driver can see surface brightness with many existing lighting systems.

Wherever these recommendations have been adopted they have been effective in varying degree. However, it also has been discovered that any such measures taken for safe streets that do not include proper visibility at night represent only a partial remedy with corresponding results.

LIGHTING COST IS LOW...

With rising costs in all classes of municipal service, street lighting costs have remained constant. They represent the smallest tabulated item in municipal expenditures. Only three cents in the tax dollar is spent on this vital service.

The annual per capita cost of street lighting service in the United States has been figured at approximately \$1.20.

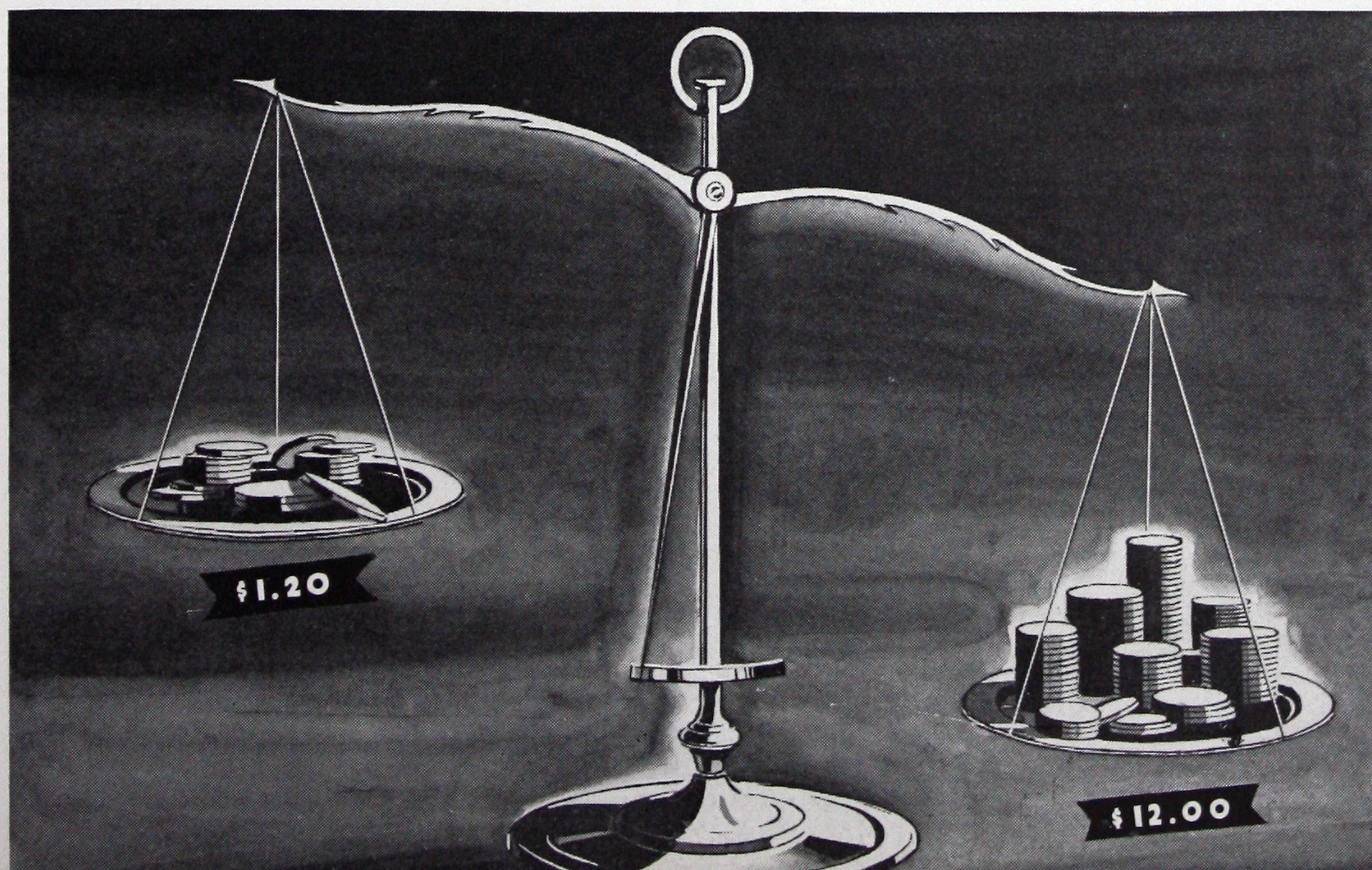
Aside from humanitarian reasons which lead to advocacy of measures which will

reduce death and suffering from motor accidents, it has been demonstrated that expenditures sufficient to provide good street lighting will prove immediately effective in reducing economic loss occasioned by traffic fatalities, and that the reduction in such losses will be greater than the expenditure for street lighting. It has been estimated that the annual economic waste from motor accidents is around \$12.00 per capita, or a total exceeding \$1,500,000,000.00.

ACCIDENT COST HIGH...

The cost of traffic accidents, then, becomes the largest item in street maintenance. The public burden is increased in the matter of hospitalization expenses; community chest and poor relief; increased cost of various types of casualty insurance and the greatest loss physically and financially to persons directly involved.

LIGHTING COST AND ACCIDENT WASTE



The annual per capita cost of street lighting in America is estimated at approximately \$1.20, while the annual economic waste from motor accidents is \$12.00 per capita; a national total exceeding \$1,500,000,000.00.

These general deductions made from nation-wide statistics may be checked by studies that are more local in character and scope. Such studies are particularly fitting at this time because there has developed a quickening of public interest in the automobile accident toll and a general appreciation of its seriousness.

BETTER LIGHTING--LESS DEATHS . . .

Going one step further, wherever studies have been made of correctly installed

lighting systems it has been found that the rate of night accidents is lowered as the degree of illumination is increased. Therefore, to reduce suffering and economic losses caused by poor driving visibility during the hours of darkness, still more light must be properly directed on the streets. To achieve such a grade of lighting, illuminating engineers now recognize a **new technique** in providing adequate fixed lights which make driving at night just as safe as that by day.

WAR!

THAN

Every year since 1924 more than 200 Cleveland citizens have been killed by automobiles.

The total in 12 years is 2,758.

In the World war 388 Cleveland soldiers were killed while fighting in Europe.

What does that mean?

Every two years victims of the traffic massacre equal the total of the city's war dead.

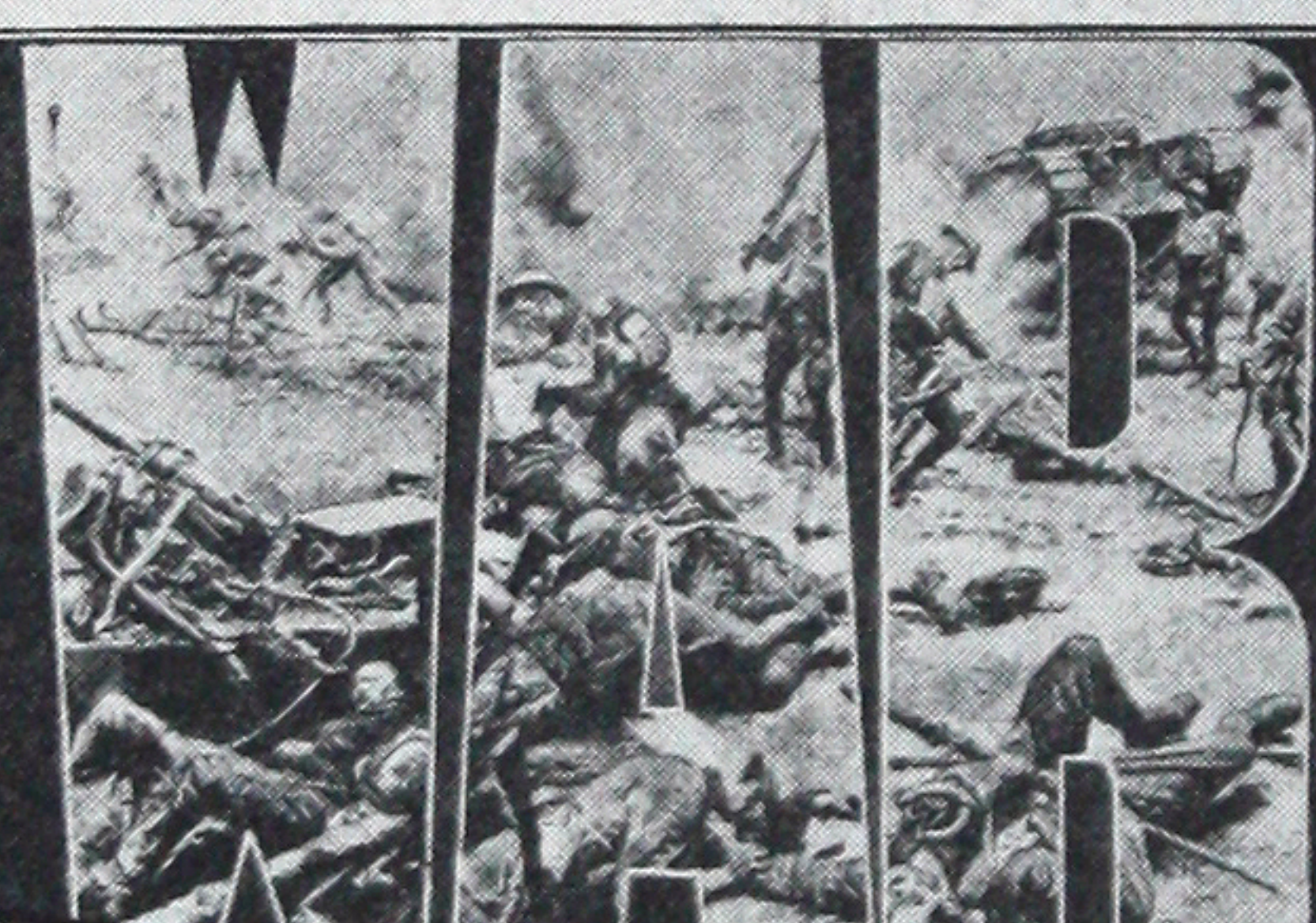
Fatality Figures

1935..201	1929..275
1934..239	1928..237
1933..214	1927..224
1932..215	1926..237
1931..259	1925..216
1930..256	1924..185

The World War claimed a total of 126,000 American soldiers killed in battle. The nation mourned their loss, shouted with joy when the Armistice came.

In 10 years, over 321,000 men, women and children have died in the United States in traffic accidents. The killings go on, year after year.

We need a traffic armistice!


YOUTH KILLED IN CAR WRECK

LINK AUTO DEATHS TO POOR LIGHTING

Early Morning Crash Hurts 5

Youth, Girl Die in Crash

Meet Auto Head-on Riding His Motorcycle on Belleville Avenue

SAFETY KILLED 13 LAST WEEK

FARMER IS KILLED IN EATON COLLISION

FATAL ACCIDENT NEAR PRINCETON

Woman Killed and Two Hurt in Crash

5-YEAR-OLD BOY KILLED BY AUTO

WICHITAN IS KILLED IN CRASH

FOUR CHILDREN HURT IN TRAFFIC

DETROITER DIES, 4 HURT IN CRASH

Death Sets Another Record!

CAR WRECK

3 Killed, 6 Hurt In N. J. Crashes

Brooklyn Men and Woman Are Among Victims

Three Persons were killed and others injured in auto accidents in New Jersey yesterday.

James Barlow, of 257 Eighth St., and Agnes Solonick, a waitress, were fatally injured when the auto in which they were riding ran into a parked car on Route 26 at North Street. The injured are Joseph Smith, his wife, Genevieve, Mrs. Mary De Cesare, of 399 Fifth St., and Dominick De Cesare, 247 Seventh St., all Brooklyn.

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POOR LIGHTING IS LINKED TO AUTO DEATHS

3,356 of 16,636 Accidents in City in 1936 Were at Night, Police Report.

80% OF DEATHS IN DARK Streets With Bad Records Are Dimmest

HOWARD VAUGHN DIES WHEN SEDAN CRASHES OVER IN COLLISION

Five Other Occupants Of Slightly Injured

Collision Takes Lives of Three

Pedestrian Hit By Auto Dies; Driver Held

Boy Hit by Auto Dies of Injuries

Four Dead, Many Hurt, Car Mishaps

Accidents Are Scattered Over State; Worst of Them Is at Wewoka; One Victim, Tulsa.

AUTOS KILLED 12 LAST WEEK

DETROITER DIES, 4 HURT IN CRASH

Death Sets Another Record!

2 Killed, 4 Hurt In New Jersey Auto Collision

TULSA WOMAN KILLED; YOUTH FACING MURDER

Arraign Wayne Mefford of Kellyville in Death Smash That Claimed Mrs. Dora Reynolds.

Wayne Mefford, 19, Kellyville, was arrested this afternoon by Tulsa police.

ONE DEAD, FIVE INJURED IN CRASH

Byron White Succumbs, Driver of Other Car in Easton Accident Near Death.

Special to The State Journal: CHARLOTTE, May 24.—Byron White, 34, of Charlotte, N.C., died this morning of injuries sustained in a crash on the highway near Easton, N.C., yesterday.

WICHITAN IS KILLED IN CRASH

Little Joyce Slar And Two Others In Collision

FOUR CHILDREN HURT IN TRAFFIC

Injuries Penalty for Not Looking Before They Run Into Street

DETROITER DIES, 4 HURT IN CRASH

Turning from a fishing trip, a man was killed and his son injured Saturday in a automobile crash in St. Clair, Mich. The crash occurred one mile south of the city. Three occupants of the car were injured in the crash.

DETROITER DIES, 4 HURT IN CRASH

Turning from a fishing trip, a man was killed and his son injured Saturday in a automobile crash in St. Clair, Mich. The crash occurred one mile south of the city. Three occupants of the car were injured in the crash.



Lighting on this Manitowoc (Wis.) street before modernization consisted of one 500-watt lamp per pole mounted in upright luminaires on trolley brackets. Little surface brightness for the driver was provided.

THE NEW TECHNIQUE . . .

The pedestrian, representing the largest group of automobile fatality victims, "should be **seen** and not hurt." In other words, the burden of avoiding a collision between automobile and pedestrian rests in greater degree on the driver than on the pedestrian. When a collision is imminent, the latter is generally too confused or too close to danger to save himself. From this, it is evident that street lighting systems should be designed to provide the most effective visibility for the automobile driver.

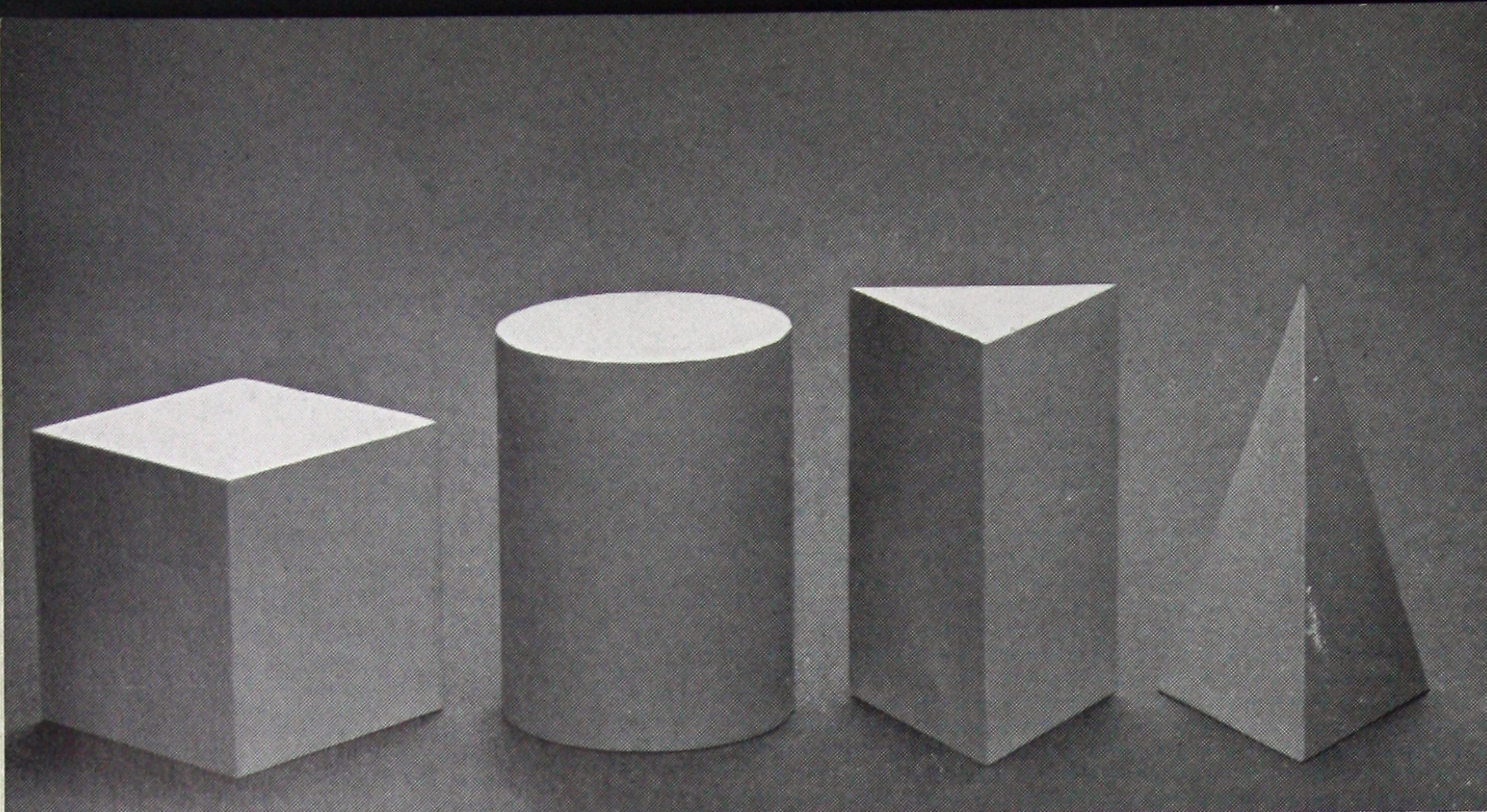
The new lighting technique provides visibility on the street so that objects, persons or other hazards are perceived quickly and with certainty by the driver of the car at a sufficient distance ahead to permit them to be avoided.

VISION AT NIGHT . . .

Objects are seen on streets at night by either of two entirely different processes. The object may be illuminated with sufficient brightness that every detail of the object is observed (i.e. "discernment by surface detail"), or the object may

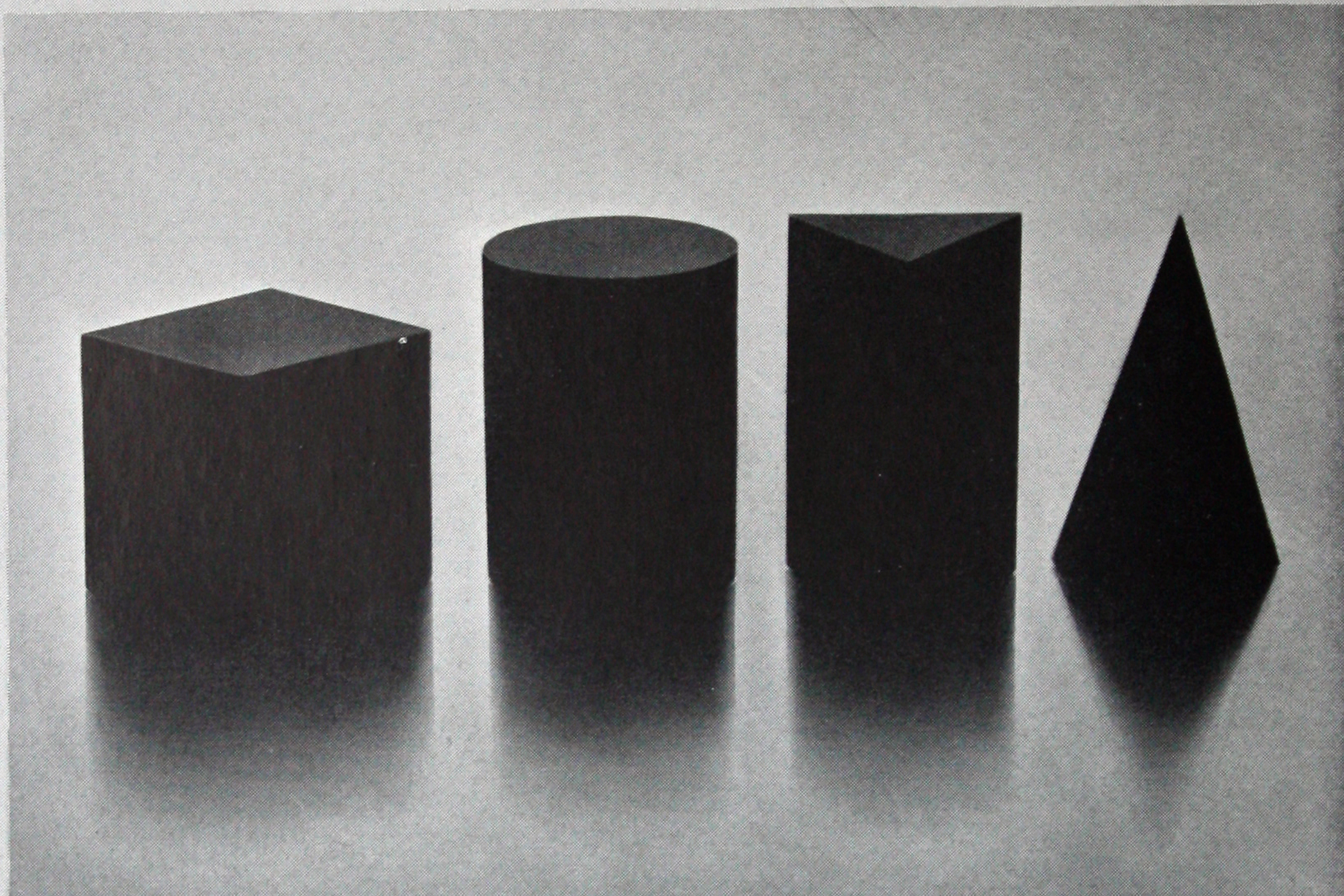
After modernization in Manitowoc, 2 pendant luminaires per pole were mounted 22 feet high; one unit equipped with a 300-watt lamp, the other with a 200-watt lamp. Adequate surface brightness is now provided.





If objects are illuminated with sufficient intensity so that the light is reflected to reveal their nature, the manner of seeing is "discernment by surface detail." These models show that principle.

If the street surface is lighted to a relatively high brightness, the observer sees objects outlined against the bright surface. This is "discernment by silhouette." These models show that principle.



be discerned as an outline contrasting with the pavement beyond, which under fixed lighting is generally brighter than the object observed (i.e. "discernment by silhouette").

Discernment by surface detail and discernment by silhouette are, to a considerable degree, mutually opposed. More light on the object provides better "discernment by surface detail", and poorer "discernment by silhouette," because the brighter the object appears, the less it contrasts with its background. Conversely, more light on the background and less on the object provides better "discernment by silhouette" and poorer "discernment by surface detail."

In recent years, strong emphasis has been laid on visibility obtaining on a street at night and on its appearance rather than on the illumination falling on its surface. And it is recognized that

objects are seen more readily by contrast, either of color or brightness, than by direct illumination.

Modern street lighting practice provides maximum road surface brightness for the automobile driver against which objects may be discerned as silhouettes. The ideal to aim at is uniform surface brightness, although in practice, it is relatively unimportant that the brightness be uniform. And where the new technique has been followed, some vision by surface detail is provided so that individual nature of street objects is discerned.

GLARE REDUCES VISIBILITY . . .

Glare is one of the most harmful results of improperly controlled light distribution. Nature closes the pupil in the observer's eye when glare is present, and results in failure to perceive objects properly and quickly. Therefore, any system of

Super street lighting is provided in many business districts for its advertising value. In these "white-way areas" visibility is satisfactory. A mercury-incandescent installation in Kansas City is shown.



Many miles of streets skirting downtown "white-way areas" and important thoroughfares leading to downtown districts are too often inadequately illuminated as this photograph shows.

fixed lights fails to serve its purpose and can become a definite hazard if glare is not minimized. Glare decreases the responsiveness of the eye to such an extent that a high level of illumination with glare is less effective for vision than would be a lower illumination with no glare.

The term "glare" is applied impartially to the discomfort experienced from a brilliant light source contrasting with its background, and to the decrease in visibility resulting from the blinding influence of the light source. The former condition is known as "discomfort glare" and the latter as "blinding glare." "Blinding glare" is the effect of the total emission of the light source in the direction of the observer and the angle the glare beam makes with the line of vision.

In the new technique, "discomfort glare" is controlled by the luminaire design, and "blinding glare" is mitigated by mounting height, lamp placement and luminaire design.

WEATHER, STREET TEXTURE . . .

Street surface conditions are of vital importance in the application of the new technique. When a beam of light falls on a surface which reflects light diffusely (as dry concrete), the rays are dispersed in every direction. The surface is visible as a bright surface when viewed from any direction. But when a beam of light falls on a surface which reflects light specularly (as wet pavement), the rays are reflected in a single direction wholly determined by the direction at which the incident beam strikes the reflecting surface. The



Visibility by automobile headlights when pavement is wet, with pedestrian at 100 feet. Note brick.



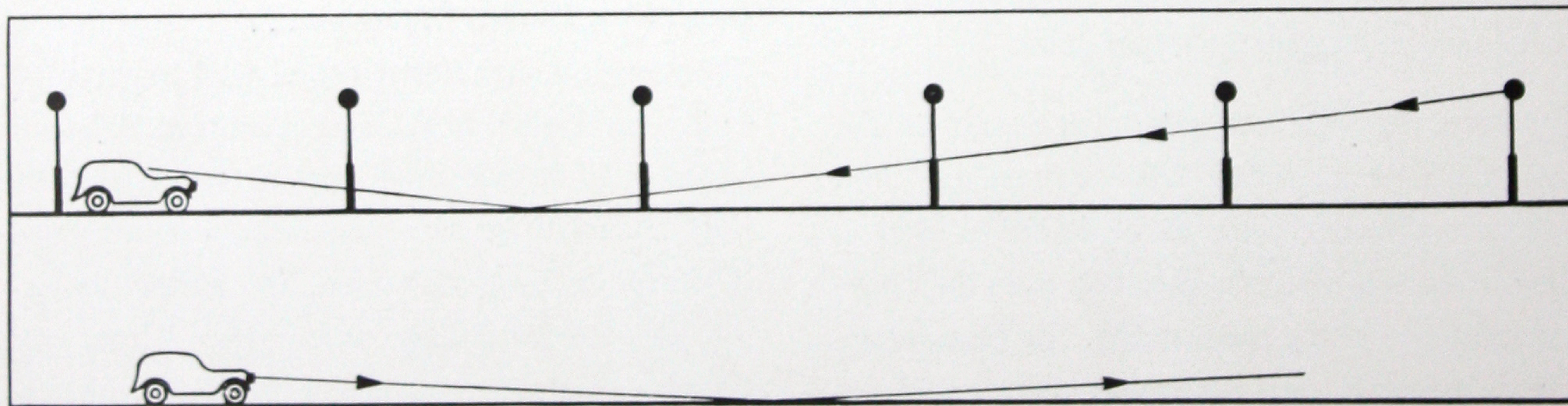
Visibility by modern fixed lighting when pavement is wet, with pedestrian at 100 feet. Note brick.

surface, therefore, is invisible, or only faintly visible, when viewed from any direction except the single direction in which the beam of light is reflected.

It is in this respect that the limitation of automobile headlights is apparent. On a rainy night the beam from the headlight strikes the street surface in such direction as to be totally reflected away from the driver's eye, failing to produce any pavement brightness.

While it is a comparatively simple problem to design a lighting system for silhouette vision on a dry white road surface, to produce surface brightness for the motorist on a dark or wet road involves refinements in luminaire design and lamp placements. Fortunately, most road surfaces possess an element of specularity and a lighting system designed for a wet road will produce adequate surface brightness on a dry dark surface. In

REFLECTIONS ON WET STREET



When a beam of light falls on a surface which reflects lights specularly, as wet pavement, the reflection is in a single direction wholly determined by the direction of the angle of incidence.

addition, it will produce adequate surface brightness on a light dry road.

LUMINAIRES OVER STREET . . .

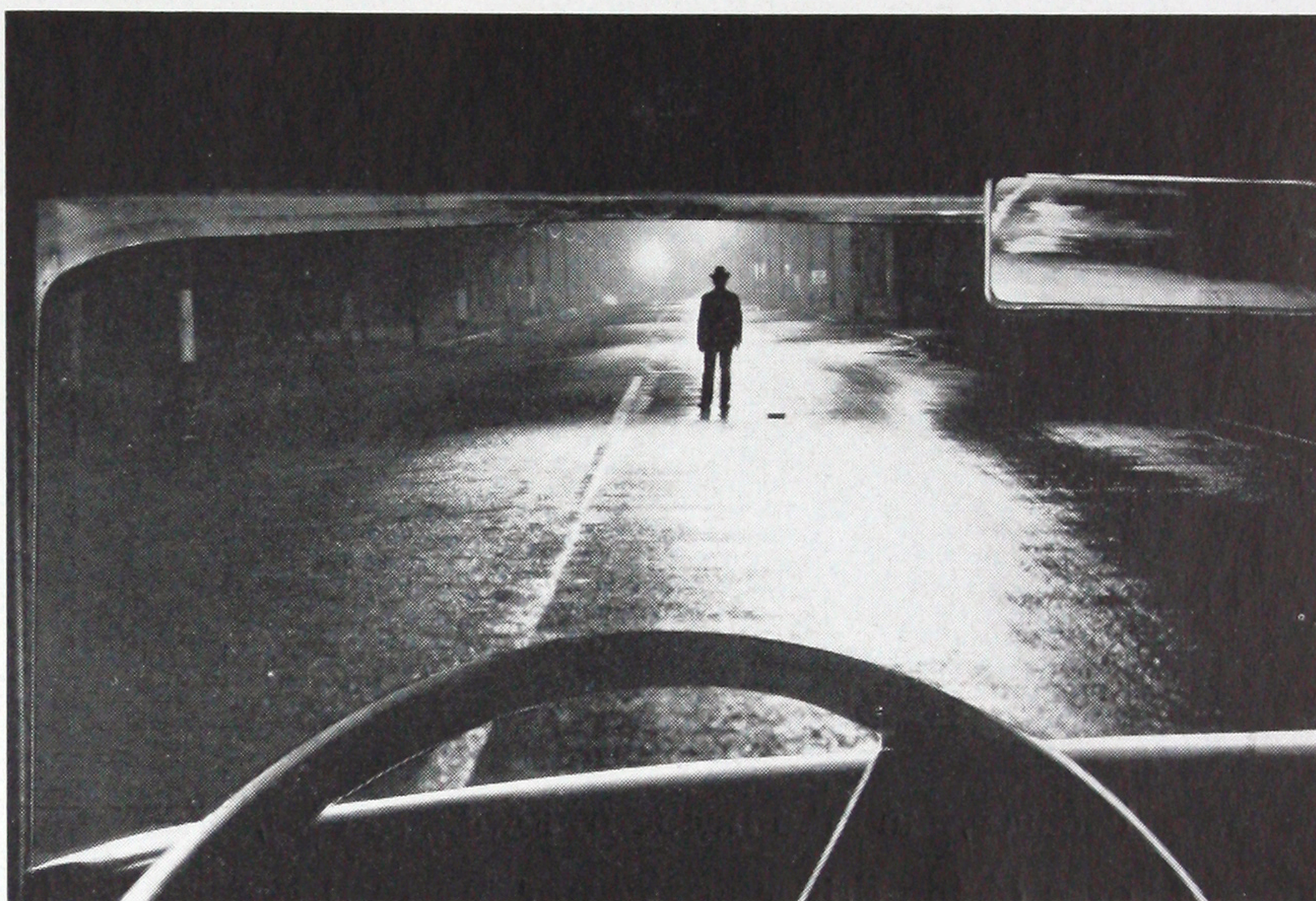
A large proportion of the light from newly designed street luminaires is delivered in the pavement. This is accomplished with the most uniform possible distribution of brightness and with the least possible glare. In order that the street surface shall appear bright to the automobile driver, it is important that much of the light reflected from it shall be in the direction of the driver. To accomplish this, the luminaires are located as far as possible over the roadway.

SURFACE BRIGHTNESS . . .

According to the Code of Highway Lighting of the Illuminating Engineering Society, the reflection factor, and hence the brightness of any surface containing an element of specularity, is affected by the angle of incidence of the light and the angle from which it is viewed. This has an important bearing on modern street lighting practice

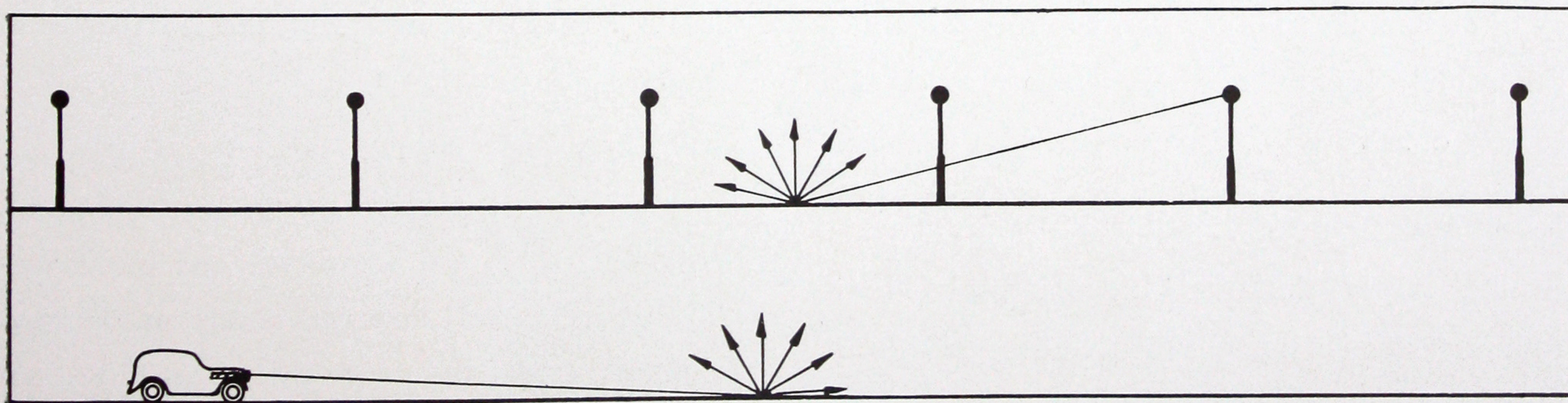


Visibility provided by headlights when pavement is wet, pedestrian at 200 feet. Note brick.



Visibility by modern fixed lighting when pavement is wet; pedestrian at 200 feet. Note brick.

REFLECTIONS ON DRY STREET



When a beam of light falls on a surface which reflects light diffusely, as dry concrete, the rays are dispersed in every direction. The street is visible as a lighted surface when viewed from any direction.



Lighting on this Buffalo street before modernization (lower left) consisted of 4,000 lumen lamps in luminaires mounted 22 feet and spaced 250 feet apart on one side of the street. After installation of 6,000 lumen lamps in Reflectolux Sr. luminaires (upper left) 110 feet apart on both sides of the street, adequate surface brightness is provided for the motorist. Beauty of design of the Reflectolux is shown in the daylight view of the same street.

because, in the modern low-built cars, the eyes of the driver are nearer the road surface than in cars of the older type, and are thus below the level at which the driver can see surface brightness with many existing street lighting systems. With the new luminaires and a specular pavement, the distant lamps, even up to 1,000 or 1,500 feet ahead of the car, contribute more to the brightness of the roadway a few hundred feet in front of the driver, than do the nearer lamps.

LUMINAIRE DESIGN . . .

In the newly designed luminaire, the light source, instead of being located in the globe itself, is located within an inverted reflector to which the globe is attached, thus the light source is completely shielded from the eye of the observer. In addition, the luminaire may be used with a

reflecting system on the house side which distributes the major portion of the light up and down the street, at the same time shielding the buildings from undesirable light emission. These luminaires are designed for a spacing-mounting height ratio of 5 to 1 and if this ratio is maintained, it will provide for the automobile driver the most uniform distribution of brightness with the least possible glare.

NIGHT BECOMES DAY . . .

The most important factors governing night traffic safety, therefore, are answered, and night visibility is provided through maximum surface brightness under the most adverse weather conditions and on the darkest street surface. Satisfactory visibility, on dry light streets is a natural occurrence and nighttime traffic perils consequently are reduced to those of the daytime.



Before Elkhart, Ind., installed modern lighting, the street shown in this unretouched photograph was a constant hazard to drivers. After sundown hazards were increased many-fold.

THE REFLECTOLUX . . .

As an answer to night driving problems, and in line with the new technique in street illumination, Westinghouse offers pendant luminaires of an entirely new design . . . The Reflectolux.

The Reflectolux Junior and Reflectolux Senior luminaires embody a combination of new features providing better and more efficient light control, less maintenance, greater flexibility and durability than ever before offered in a comparable unit.

Westinghouse engineers developed the Reflectolux luminaire on the basis of providing adequate visibility at night under all weather conditions.

The Reflectolux creates greater brightness on the street surface for the automobile driver, practically eliminates glare, offers co-ordination of silhouette vision and vision by surface detail, directs the light flux up and down the street and, when installed in accordance with recommendations, provides a uniform distribution of brightness on the pavement.

NEW REFLECTING MEDIUM . . .

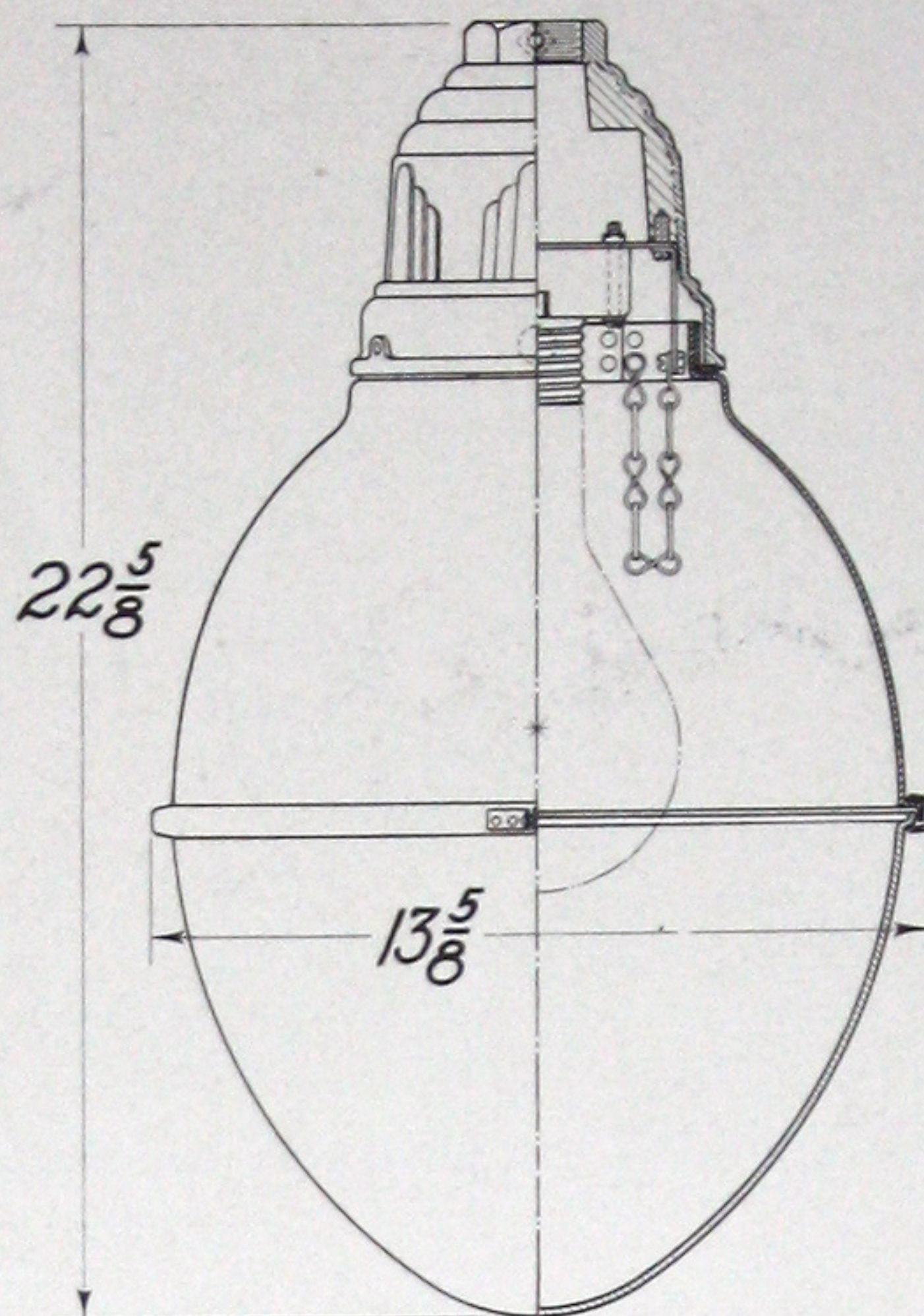
The impetus for the new principle in the Reflectolux was supplied by the perfection of the Alzak Process as applied to an aluminum reflecting surface. The high reflectivity and permanency of

After modernization, lighting in Elkhart provides the safest possible night visibility conditions for the driver. Uniform distribution of surface brightness makes for night driving safety.





Reflectolux Jr. low voltage luminaire without ornaments.



Reflectolux Jr. low voltage luminaire with ornamentation.

the finish, durability and ease of fabricating aluminum in suitable shapes and forms have opened a new field in the development of luminaires, and are filling the gap which existed between economical and efficient lighting units.

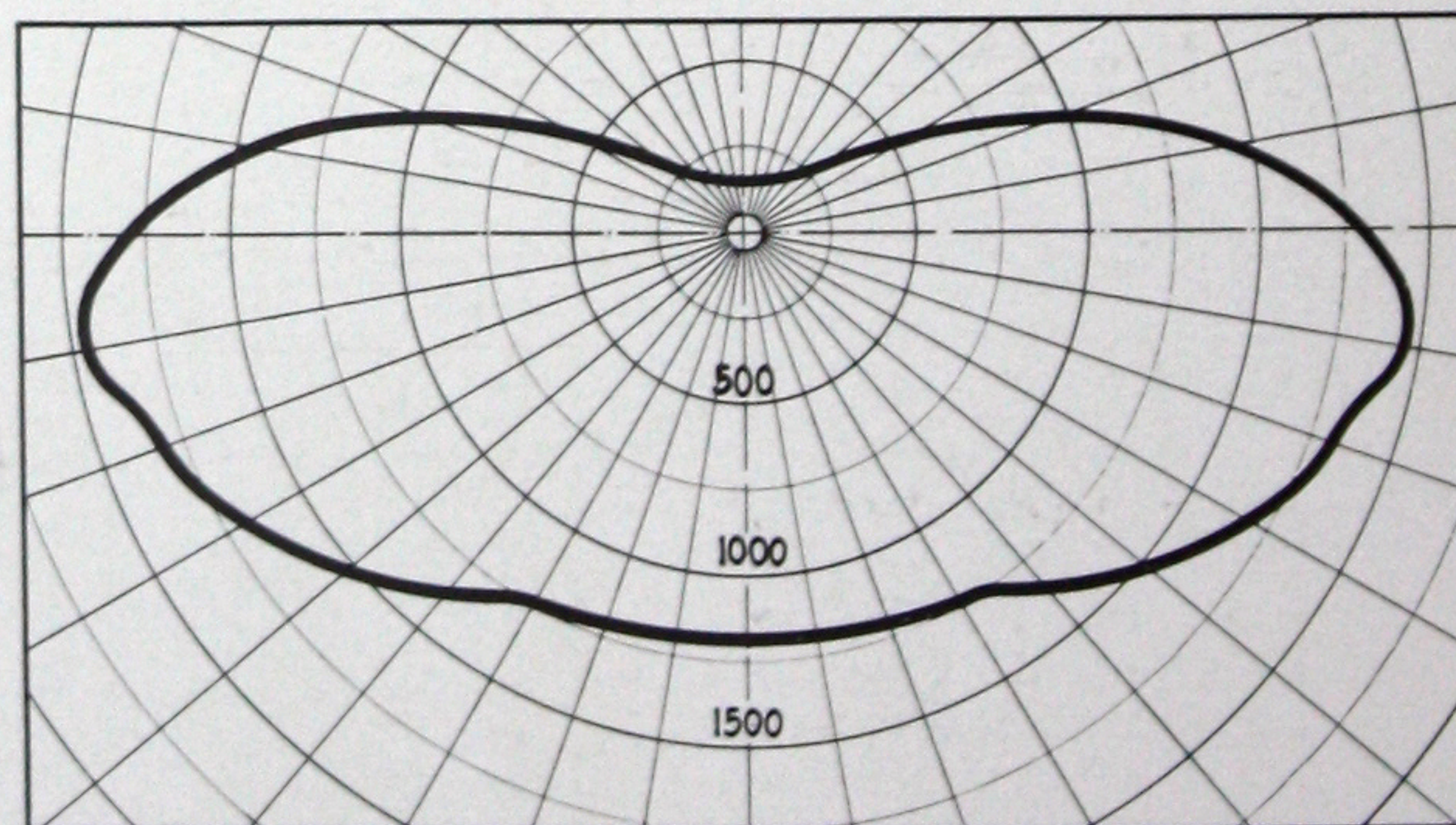
REFLECTOLUX JR.—LOW VOLTAGE TYPE . . .

The Reflectolux Junior is available for two general services—low and high voltage. The low voltage unit is designed for circuits of 3,500 volts or less and for lamps up to 10,000 lumens or 500 watts. The high voltage Reflectolux Junior is designed for use on straight series circuits with 2,500-, 4,000-, 6,000-, 10,000-lumen lamps. The high voltage units have a maximum flashover rating of 30,000 or 60,000 volts depending on the use of dry or wet process porcelain.

The two Reflectolux Junior types consist essentially of a socket housing—cast iron on the low voltage type and porcelain on the high voltage—with three bayonet pins, reflector with three bayonet slots, globe holder and globe.

BIFLECTORS PROVIDED . . .

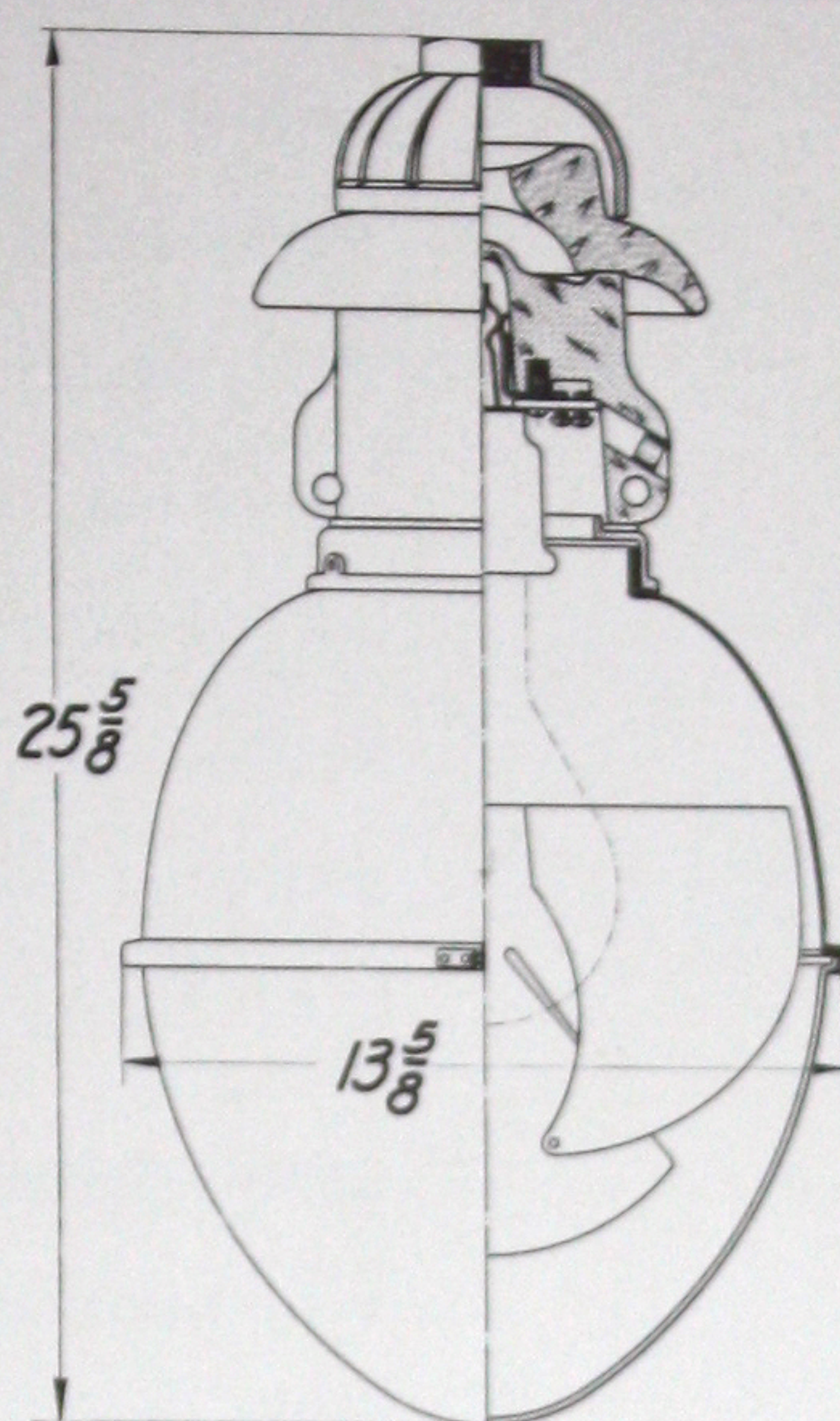
The main reflector for the Reflectolux Junior is spun from a heavy gauge Alclad Aluminum disc following a contour carefully determined to provide uniform surface brightness on the street. Specular Alzak finish is applied to the inside surface of the reflector after it is fabricated. The reflector top opening is large enough to clear the largest size lamps for which the unit is designed. This simplifies cleaning and relamping since it eliminates the necessity of removing the glassware. For asymmetric distribution, specular aluminum biflectors finished by the Alzak process are



Horizontal distribution through 70° cone of asymmetric Reflectolux Jr. with 300-watt lamp.



Reflectolux Jr. high voltage luminaire, types DP and WP, without ornaments.

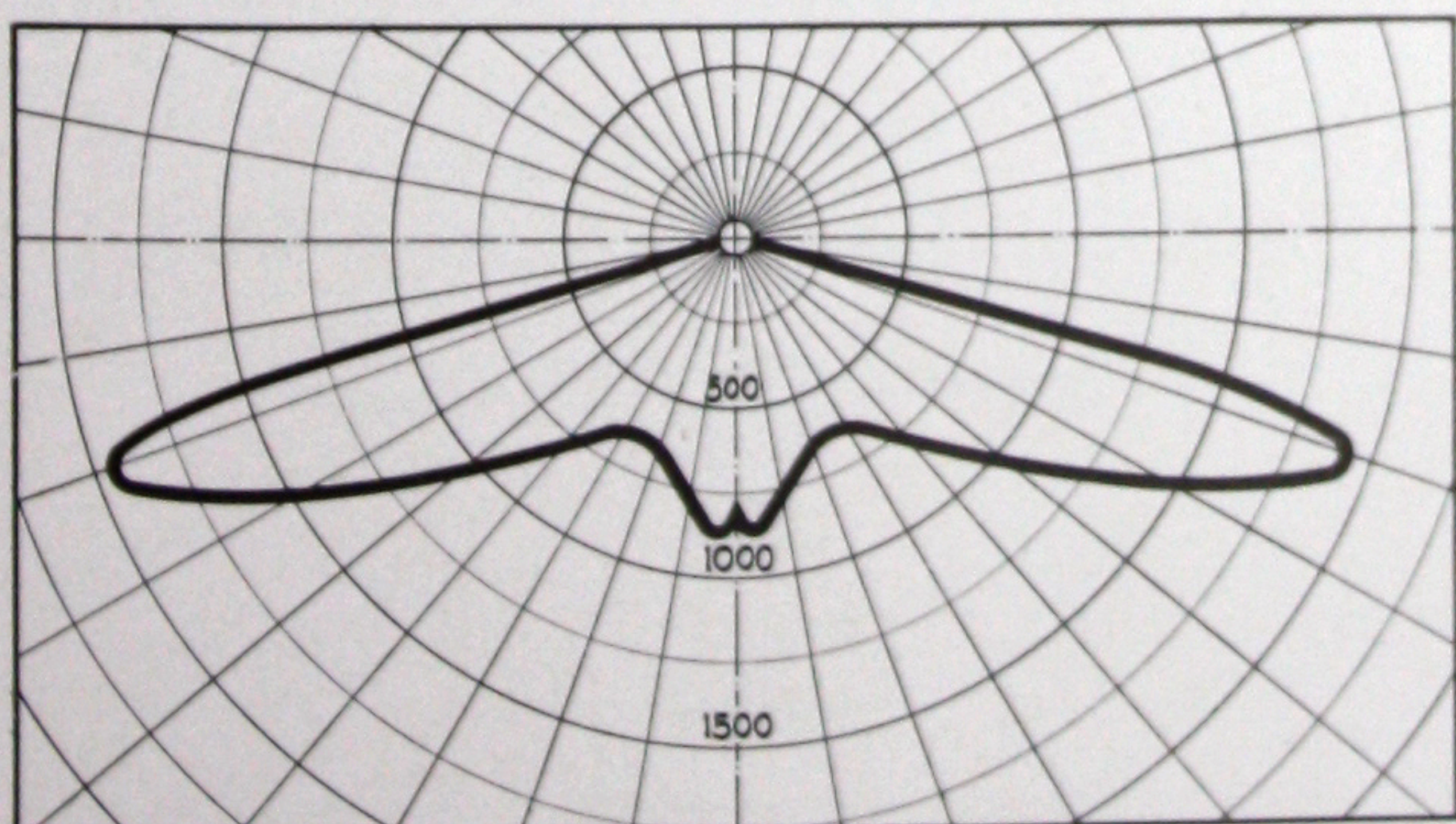


Reflectolux Jr. high voltage luminaire, types DP and WP, with ornamentation.

mounted inside the main reflector forming an integral part of the unit. The biflectors are rigidly braced to insure their proper relation to the main reflector and to maintain the desired light distribution. The biflectors increase the light intensity along the street to approximately three times the intensity of the bare lamps. The biflectors also shield the light beams from the buildings across the sidewalk.

SPECIALLY BUILT GLOBE . . .

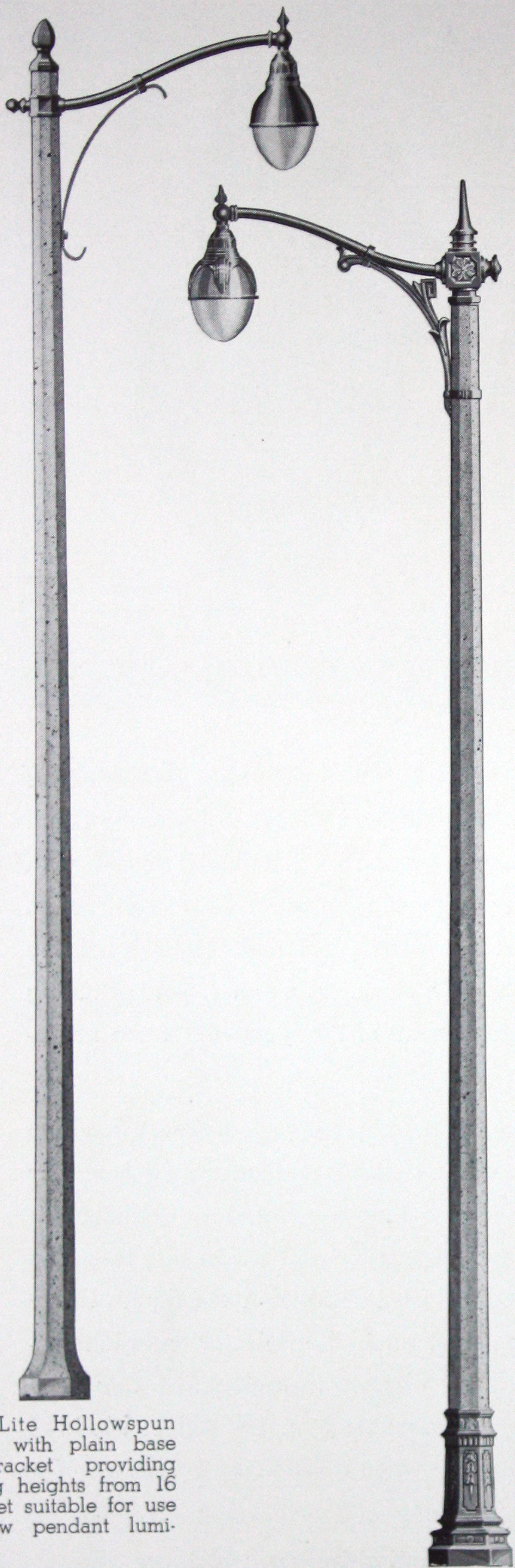
The globe is constructed specially for the Reflectolux Junior and conforms to the general contour of



Vertical distribution through maximum of asymmetric Reflectolux Jr. with 300-watt lamp.

the luminaire. It is of a rectilinear design and is held to the reflector by means of a globe band. The globe is sealed in a gasketed recess spun integrally with the reflector. This construction provides a weatherproof seal, securely holding the globe in a strainless manner, yet permitting easy replacement of the glassware when necessary.

By engaging the bayonet pins of the canopy into the slots of the reflector and locking the assembly by means of a thumb screw, the installation is simple and relamping becomes an easy task. The lineman needs only to loosen the thumb screw in the canopy, rotate the reflector and globe assembly a few degrees in a clockwise direction, releasing the bayonet pins. The reflector is held to the canopy when disengaged by means of a chain. Simplicity of the bayonet arrangement eliminates the use of latches, which are affected by the elements and are easily pried out of shape, thereby reducing their reliability.



Pend-a-Lite Hollowspun standard with plain base and bracket providing mounting heights from 16 to 20 feet suitable for use with new pendant luminaires.

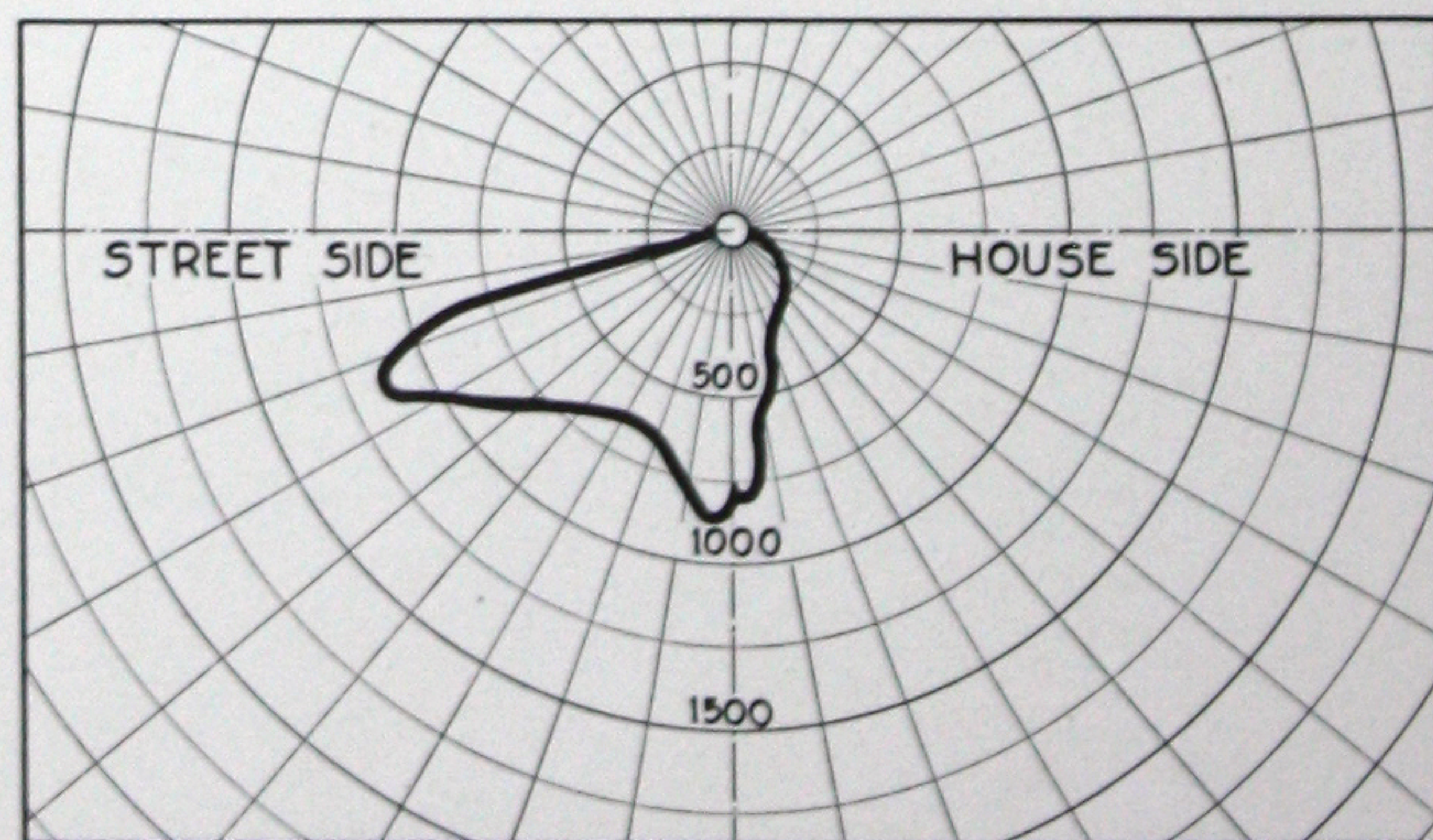
Pend-a-Lite Hollowspun standard with ornamental base and bracket providing mounting heights from 16 to 20 feet suitable for use with new pendant luminaires.

LOCATION OF LIGHT SOURCE . . .

To eliminate "glare" by producing a sharp cutoff below the horizontal and removing the light source from the range of vision, the location of the lamp light center is approximately two inches above the bottom of the main reflector. The location of the receptacle and sockets in all types of Reflectolux Junior luminaires for the proper light center is fixed at the factory and does not have to be changed in the field.

ORNAMENTS MAY BE ADDED . . .

While the appearance of the luminaires does not affect their performance, the desirability of more attractive lighting units is apparent when so much attention is being paid to city beautification. The appearance of the Reflectolux Junior luminaires is attractive, but the addition of ornaments makes the luminaires more decorative. The exterior surfaces of all metal parts of the luminaire without additional ornaments are painted green, while on the luminaire with ornamentation, the exterior surface of the reflector is aluminum finished by the Alzak process to contrast with the green finish of the ornaments and all other metal parts of the luminaire. The ornaments are made of cast aluminum and easily slide over the reflector. They can be added without difficulty in the field.



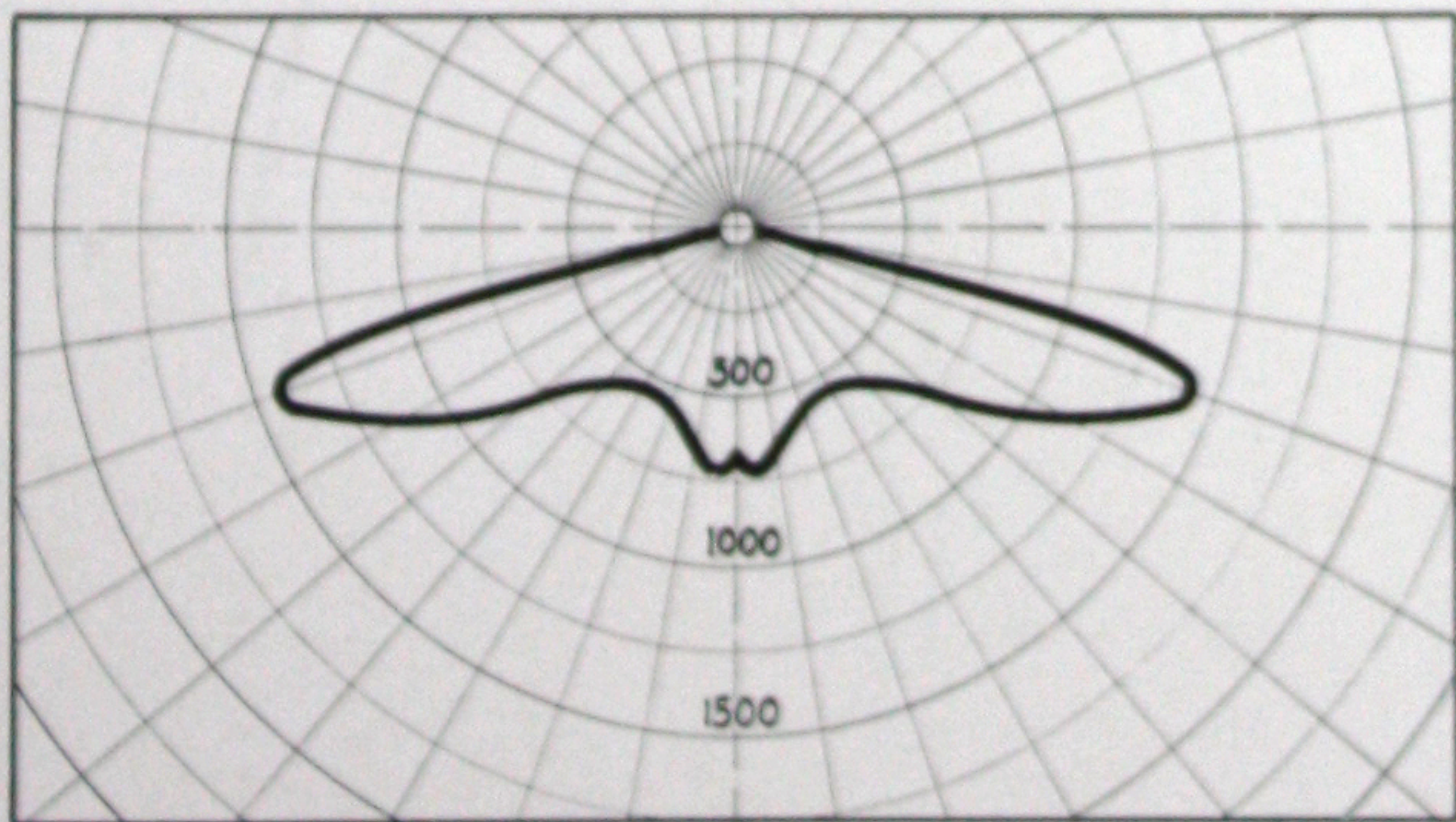
Distribution in vertical plane 90° from the curb; asymmetric Reflectolux Jr. with 300-watt lamp.

REFLECTOLUX SENIOR . . .

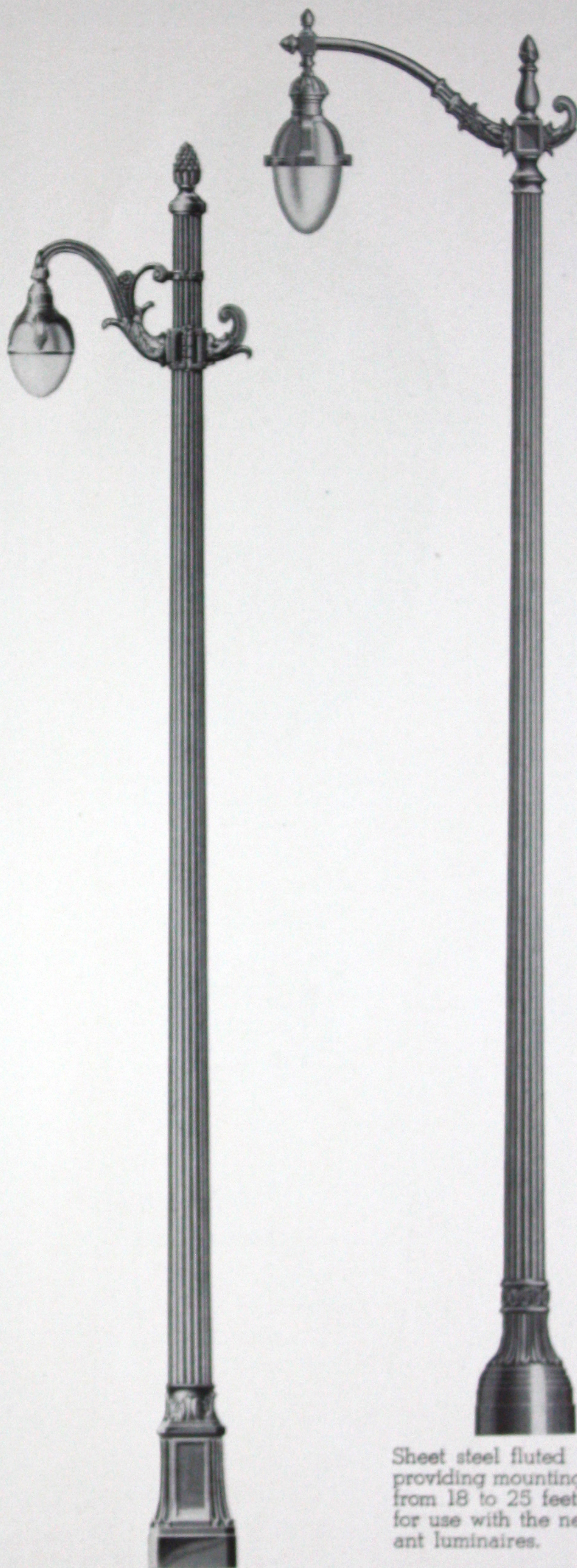
Following a street illumination trend for still larger lamps and greater candle power, Westinghouse engineers have developed the Reflectolux Senior luminaire. The Senior unit is larger in all dimensions but includes the basic light distribution features of the Reflectolux Junior. The Reflectolux Senior is designed for use with lamps rated up to 15,000 lumens or 750 watts.

The Reflectolux Senior consists of a cast iron canopy with four pins, spun copper casing with four bayonet slots, cast aluminum body with internal reflectors for symmetric or asymmetric distribution, hinged cast aluminum globe holder with globe band, a clear or light alabaster rectilinear globe.

The canopy is tapped for 1 $\frac{1}{4}$ -inch pipe, the cast aluminum housing and copper casing, which are held together by four screws, are supported on and easily removed from the canopy by disengaging the bayonet slots from the pins. The internal reflector for symmetric distribution or the internal reflector with biflectors for asymmetric distribution are rigidly supported in the cast aluminum housing, and are essentially of the same construction as the reflectors in the Reflectolux Junior luminaires. The globe holder incorporates the proved Westinghouse toggle latch. Waterproof felt gaskets are provided to assure a dustproof



Vertical light distribution of symmetric Reflectolux Jr. with 300-watt lamp.

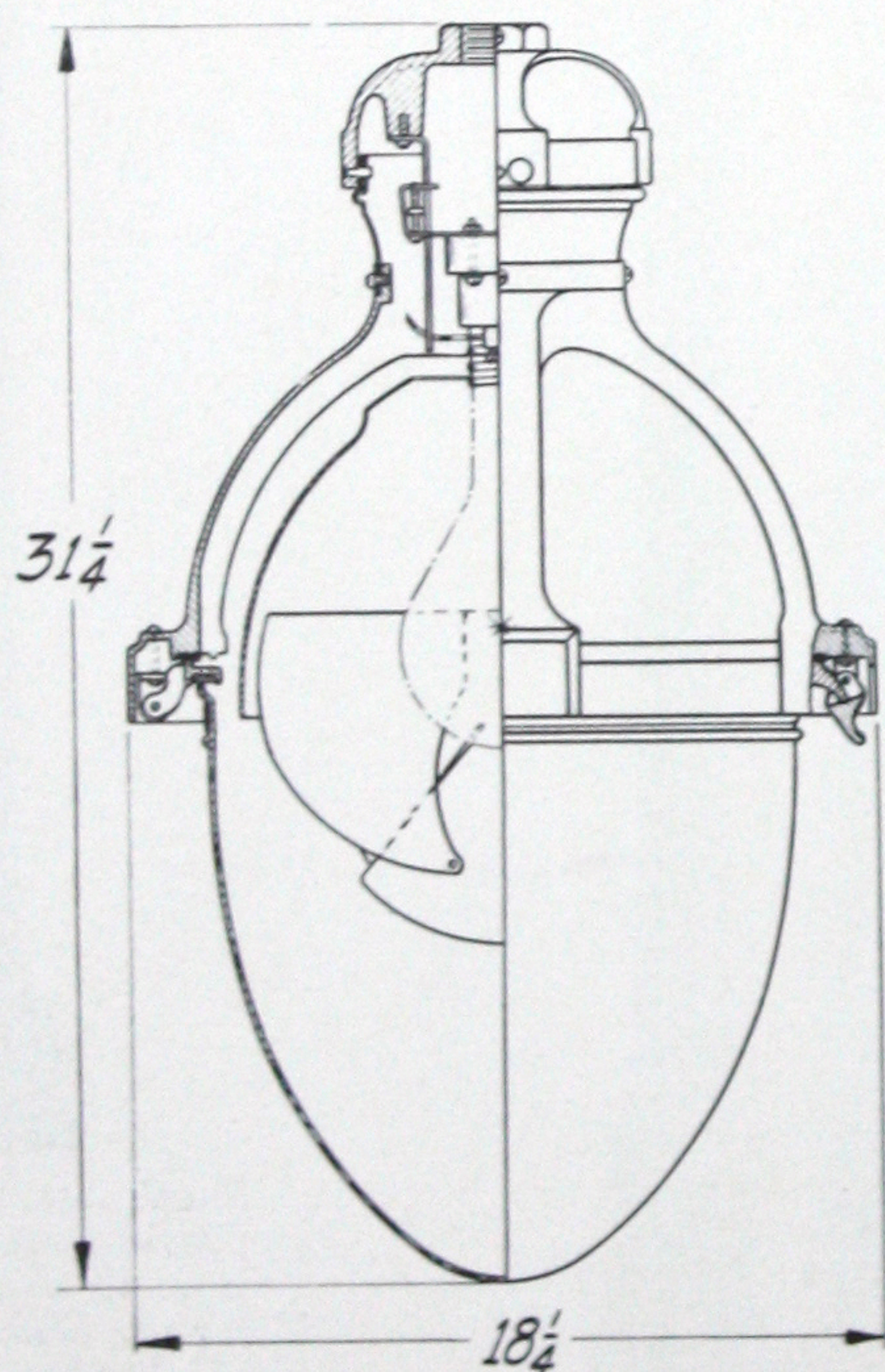


Sheet steel fluted standard providing mounting heights from 18 to 22 feet suitable for use with the new pendant luminaires.

Sheet steel fluted standard providing mounting heights from 18 to 25 feet suitable for use with the new pendant luminaires.



Reflectolux Sr. luminaire
for lamps up to 15,000
lumens or 750 watts.



Sketch of Reflectolux Sr.
luminaire showing shielded
light source and biflectors.

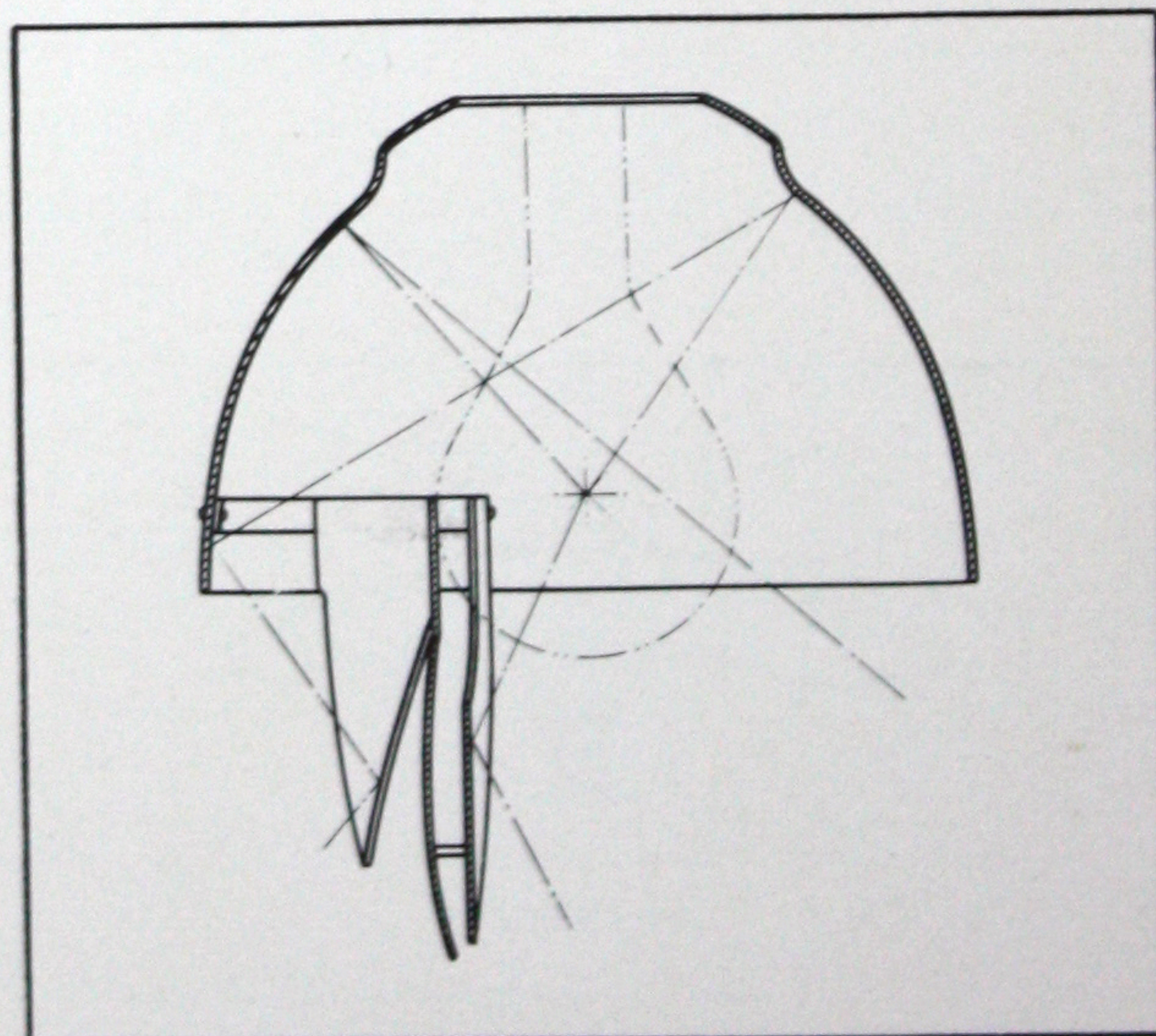
and weatherproof unit. An adjustable socket support provides means for adjusting the light center.

By lengthening the copper connection between the canopy and the reflector housing, an auto transformer can be placed within the luminaire.

The Reflectolux Senior is of an attractive design, presenting a pleasing appearance at close range as well as at conventional mounting heights. An enduring green enamel finish adds to its attractiveness.

SAFETY—WITH LIGHT . . .

Thus, Westinghouse offers new, economical and efficient pendant luminaires, which are adaptable to any type of installation both with respect to appearance and to utilization. In the Reflectolux principle lies the solution to the deplorable rise in night traffic accidents. Only after the installation of such a lighting system can the safety warnings and campaigns directed at the driver be effective. The glareless light and the surface brightness provided by the Reflectolux Junior and the Reflectolux Senior furnish the motorist with a safe night driving system which most nearly approaches daylight driving. Hence, the night driver is provided SAFETY . . . with light.



Light ray reflection principle of Reflectolux providing shielded light source and asymmetric distribution.





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